

## REMARKS

By this Amendment, a number of claims have been cancelled. Other claims have been amended so as to more clearly set forth the present invention. As explained below, the pending claims are not anticipated by the cited pages of the Zyskind et al. publication, namely pages 29 and 39 thereof. Additionally, as described below, the application and pending claim program are in full compliance with 35 U.S.C. §112. Replacement drawings are submitted herewith in accordance with the Examiner's requirements.

In numbered section 7 of the Office Action, page 8, the Examiner has rejected the pending claims as anticipated by the disclosure of pages 29 and 39 of Zyskind et al. Anticipation is a well defined doctrine in patent law. It is well recognized that:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single, prior art reference." (MPEP 8 Ed., Rev. 2, May, 2004, pg. 2100-73)

The Examiner's rejections of the pending claims do not comply with the standards for anticipation as set forth in the MPEP and as noted above.

In explaining the pending anticipation rejection, the Examiner referred to the fact that the cited page 29 discloses:

"a plurality of optical links, a plurality of amplifiers, and a plurality of transmitters."

However, the Examiner in rejecting pending claims 1-9, 21-29 and 31 has failed to address the fact that pending claims 1, 25 and 30 are independent claims which include limitations not noted in the Examiner's comments. In this regard, claim 1 requires:

"the amplifiers have a common gain profile with respect to a predetermined range of wavelengths" (claim 1)

Similarly, claim 25 includes the following limitation not referred to in the Examiner's commentary and not disclosed on page 29 of the cited document:

"at least some of the amplifiers exhibit common game profiles ... whereby each transmitters upward power is set in accordance with an inverse of the game profile raised to a predetermined exponent." (pending claim 25)

Further, relative to independent apparatus claim 30 the following limitation is completely unmet by page 29 of the cited document:

"a plurality of optical emitters for providing optical signals to be transmitted through up to a predetermined maximum number of optical spans and associated amplifiers; and circuitry coupled to the emitters for adjusting an output parameter profile of the emitters in accordance with an inverse of a composite amplifier gain profile wherein the composite profile incorporates a common gain profile associated with members of each plurality." (pending claim 30)

As noted above, the Examiner's explanation as to the basis of the outstanding anticipation rejection has failed to address at least the above noted limitations in claims, 1, 25 and 30. In this regard, page 29 is completely silent as to the above-quoted limitations. Hence, for at least the above reasons, none of independent claims 1, 25 and 30 or their related dependent claims are anticipated.

Indeed, page 29 teaches away from the above noted limitations. Page 29 states, in part:

"In the following sections, we discuss in more detail the three basic terrestrial applications of EDFA's: power amplifiers, preamplifiers, and in-line amplifiers. Each application has vastly different requirements. Therefore, the design rules and the operating regimes for each application require careful examination."

As the above makes clear, the characteristics of the amplifiers vary substantially. This deficiency alone makes it clear that the subject claims are not anticipated by the disclosure of

page 29 of the cited document. The disclosure of page 39 of that document is also deficient. Hence, alone or in combination, cited pages 29, 39, do not anticipate any of the pending claims.

Further, dependent claim 5 incorporates the following additional unmet limitation:

"the receiver exhibits an input range and signals coupled to the receiver, in accordance with transmitter parameter output values, fall within the input range."

Claim 9 adds the following additional unmet limitation:

"the pre-emphasis circuits establish a power output profile for the source, on a per channel basis, in accordance with the inverse of the common gain profile."

Dependent claim 27 adds the following additional limitation unmet by the cited document:

"wherein less than S optical links extend between the plurality of transmitters and the receiver and wherein S does not exceed the value of the exponent." (pending claim 27)

The disclosure of page 39 referred to by the Examiner does not make up for the deficiencies of the disclosure of page 29. For the above reasons, the disclosures of pages 29 and 39 of the cited document, alone or in combination, simply fail to meet the above noted standard for anticipation elucidated by the MPEP. The doctrine of inherency does not make up for the deficiencies of the disclosures of pages 29 and 39 of the cited document. Inherency requires certainty of result without variation. In the absence of any disclosure as to the characteristics of the various amplifiers in question on pages 29 and 39, the certainty of result required by the doctrine of inherency is simply not present in this instance.

The Examiner rejected pending method claims 10-20 and 31 in a very cursory fashion without addressing the various limitations thereof. As noted above, anticipation requires that the

cited prior art document disclose all of the limitations of the allegedly anticipated claim in exactly the same fashion as claimed. The Examiner has failed to demonstrate how the disclosures of pages 29 and 39 of the cited document meet this standard relative to claims 10-20 and 31.

For example and without limitation, method claim 14 includes the following limitation which is completely unmet by pages 29 and 39 of the cited document:

"raising selected values of the inverse function to a predetermined exponent" (pending claim 14)

Similarly, claim 18 adds the following limitation which is not addressed by pages 29 and 39 of the cited document:

"dynamically altering laser power settings in accordance with changing network parameters." (pending claim 18)

Claim 19 adds the following limitation not addressed by pages 29, 39 of the cited document:

"providing pre-set laser modules for installation in a network where the number of optical spans between a module and a respective receiver is not larger than a predetermined exponent." (pending claim 19)

Unaddressed method claims also incorporate limitations not disclosed by the noted pages 29, 39 of the cited document. Thus, for at least the above reasons, none of the pending claims are anticipated by the prior art of record.

In numbered section 5 of the Office Action, a number of the claims have been objected to pursuant to 35 U.S.C. §112, second paragraph, in view of the presence of alleged indefinitenesses. As explained below, those objections are either not well founded or have been obviated in view of amendments.

It is well recognized that the claims are directed to those of skill in the art. The claims do not need to set forth manufacturing details.

The Examiner objected to claim 1 because allegedly there is insufficient antecedent basis for the limitation in claim 1 which states:

"the members of the plurality emit signals at predetermined, different output parameter values".

The "members of the plurality" limitation finds antecedent basis earlier on the same line in phraseology which states "a plurality of transmitters of optical signals". The phraseology which states:

"emit signals at predetermined, different output parameter values"

does not need a prior antecedent basis as it is a recitation of characteristics of the members of the "plurality of transmitters" which have been previously recited in the claim."

It is believed that the Examiner's objection to claim 4 has been obviated by the amendment to claim 2.

The Examiner has objected to claim 6 on the basis that the phrase "a selected parameter" has insufficient antecedent basis. This limitation is first introduced at this point in the claim by the article "a". It does not need a prior basis as the article "a" indicates that it is being introduced into the claim for the first time.

The amendment to claim 6 it is believed, obviates the Examiner's objection to the limitation "the members of the plurality" in line 4. Finally, the Examiner has objected to "channel based radiant energy beams" in claim 6 as "not clear".

It goes without saying that the claims are to be read by those of skill in the art in light of the specification and figures of the application. In this regard, the Examiner's attention is directed to the fourth full paragraph on page 4 of the application, the first full paragraph of page 5 of the application, the second full paragraph of page 5 of the application and the paragraph starting at the bottom of page 6 and extending through page 7 of the application. All describe channel based characteristics of the present invention. It is submitted that claim 6 does in fact comply with the requirements of the second paragraph of 35 U.S.C. §112.

The prior art of record, cited by the Examiner, makes clear that the level of skill in the art is very high. Under the circumstances, the noted objection to claim 6 is not well founded. It is requested that it be withdrawn.

The Examiner has objected to claim 7 which contains a limitation which states:

"an inverse of the common gain profile raised to an exponent corresponding to the number of links."

In making this objection, the Examiner has stated:

"it is not clear how to raise the 'inverse of common gain profile' to an exponent."

It appears that the Examiner is misapplying the requirements of 35 U.S.C. §112, second paragraph. Claim 7 states a limitation which it is submitted would be understood by those of skill in the art. Scientists and engineers have long known how to raise functions to exponents. Hence, unlike the Examiner's conclusion, those of skill in the art would also understand how to "raise the inverse of common gain profile" to an exponent. (Office Action, 2<sup>nd</sup> & 3<sup>rd</sup> line of page 7)

An apparatus claim need not recite all of the steps required to carry out the functionality thereof where those of skill in the art would understand how to do so. It is requested that this objection to claim 7 be withdrawn.

The Examiner has objected to claim 10 which includes a limitation which states "setting an output parameter of ...". In this regard, the Examiner's attention is directed, for exemplary purposes only, to the third full paragraph of page 7 of the present application which provides an example of a parameter of a transmitter which can be set. This is not the only parameter which can be set as would be understood by those of skill in the art. However, the claim need only be sufficient to define the respective invention to those of skill in the art. As such, it is submitted that the disclosure and figures of the present application, including the above noted exemplary paragraph, are more than sufficient to apprise those of skill in the art as to the meaning of the subject limitation in claim 10.

As to the objection to claim 11, "establishing" has been recited in claim 10. It is believed that the amendment to claim 11 obviates the Examiner's objection thereto. Further, it is believed that the objection to claim 13 is not well founded for the reasons set forth relative to the objection to claim 10. It is believed that the amendment to claim 16 obviates the objection thereto. Similarly, it is believed that the amendment to claim 25 obviates the objection to claim 27. It is also believed that the amendment to claims 27 and 29 obviate the objection to claim 29.

The objection to claim 30, it is believed, is inconsistent with the claims when read in the light of the specification and figures of the present application. In this regard, the Examiner's attention is directed to the exemplary system of Fig. 3 which incorporates pluralities of power amplifiers such as 14a, c and preamplifiers such as 14b. The members of the plurality of power amplifiers are coupled to the members of the plurality of preamplifiers by optical spans such as 16-1, -2 ... -s. Hence, for all of the above reasons, it is believed that those of skill in the art would understand claim 30.

The Examiner in section 4 of the Office Action objected to claims 1-31 of the application pursuant to 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. As noted above, the claims are directed to those of skill in the art, trained scientists and engineers, who can be expected to read them in light of the specification and figures of the

subject application. There is no requirement that an engineering or manufacturing specification be provided. Further, it is also well recognized that there is no requirement that the claims use the same terminology as present elsewhere in the application.

Relative to the Examiner's objections, as to claim 1 the Examiner has asserted that:

"the instant application does not teach what it means by the 'output parameter values'."

In making the above statement, the Examiner has failed to take into account the disclosure of the specification and figures of the subject application. In this regard, the Examiner's attention is directed to the last two lines of page 6 through the end of page 9 which discusses, relative to an exemplary embodiment, establishing and setting power output profiles of transmitters, such as transmitters 24 of the system 20 of Fig. 3. It is submitted that one of skill in the art would understand how to make and use the invention of claim 1 from the present application and figures.

The Examiner has objected to claim 6 because the application allegedly fails to describe "channel based radiant energy beams" as well as "a selected parameter". This conclusion is inconsistent however with the above noted disclosure and figures for the application.

The disclosure and figures of the application at least starting on page 6 with the description of Fig. 3 through the end of page 9, in association with the figures referred to therein, enables a person of skill in the art to make and use the invention recited in claims 6 through 9. In this regard, the Examiner's attention is specifically directed to the last two lines at the bottom of page 6 through the end of the 3<sup>rd</sup> paragraph on page 7 which provide the required description to enable a person of skill in the art to make and use the invention of claims 6-9. Similar comments apply to the objection to claim 10. More specifically and without limitation, the second and third full paragraphs on page 7 state:

"In order to minimize gain variations, due to amplifier variations, as illustrated in Fig. 2, pre-emphasis circuits 28 set the output power profile of transmitters 24 in accordance with the inverse of the common, composite gain profile of the amplifiers associated with spans 16-1, -2, -3, ... -S raised to a predetermined exponent. For example, and without limitation, where S equals 2, there are two composite gain elements between module 30 and receiver 32. Where S equals 4, there are four composite gain elements in the four spans.

Fig. 4 is an exemplary, composite plot of the inverse of the gain profile of a composite gain element which incorporates a power amplifier, such as 14a, and a preamplifier, such as 14b (having gain profiles as in Fig. 2) raised to the power of 2. Where the pre-emphasis circuits 28 are adjusted in accordance with the profile of Fig. 4, gain variations, which otherwise multiply as signals travel through respective spans, S1, S2 of the network 20 can be eliminated. Similarly, where the value of S equals 4, pre-emphasis circuitry 28 can be set such that the power output profile of transmitters 24, on a per-channel basis, corresponds to the inverse of the composite gain profile raised to the fourth power. Once again, gain variations due to amplifier gain profiles can be minimized or eliminated in up to four spans". (second & third paragraphs, page 7 of present application)

In objecting to claim 25 the Examiner stated:

"the instant application does not teach how the "plurality of transmitters" are coupled to "an input of a selected link", and how many amplifiers the signals from the "plurality of transmitters" go through." (page 5, Office Action, lines 6-8).

It is submitted that those of skill in the art would understand how to couple the disclosed plurality of transmitters 24 at exemplary terminal 12-1 to the respective link 16-1 to an amplifier 14a. The details as to how a plurality of transmitters in a wavelength division multiplexed optical system can be coupled to an optical link are well known to those of skill in the art as illustrated by block 1A of Fig. 1 of Taga et al. U.S. Patent 5,790, 289 of record herein. Conventionally, optical multiplexers such as optical multiplexer 10 disclosed therein can be used for this purpose.

Further, in response to the Examiner's statement that the present application does not teach "how many amplifiers or signals from the "plurality of transmitters" go through does not take into account the description of Fig. 3 which starts at the second full paragraph of page 6 which explains how many amplifiers, the signals from the plurality of transmitters might go through. For example, the Examiner's attention in this regard is directed to the second full paragraph of page 7 which states:

"In order to minimize gain variations, due to amplifier variations, as illustrated in Fig. 2, pre-emphasis circuits 28 set the output power profile of transmitters 24 in accordance with the inverse of the common, composite gain profile of the amplifiers associated with spans 16-1, -2, -3, ... -S raised to a predetermined exponent. For example, and without limitation, where S equals 2, there are two composite gain elements between module 30 and receiver 32. Where S equals 4, there are four composite gain elements in the four spans." (second paragraph, page 7 of present application)

Thus, for all of the above reasons, it is submitted that the disclosure and figures clearly enable a person of skill in the art to make and use the invention of claims 25-29.

In objecting to claim 30, the Examiner has asserted that the instant application does not teach "what is the 'output parameter profile' and how to adjust the 'output parameter profile'".  
(page 5, Office Action)

This objection fails to take into account the text and figures of the present application which describes an exemplary system in Fig. 3 starting at the second full paragraph of page 6 through at least the second full paragraph of page 7. In this regard, the Examiner's attention is directed to the following starting at the last two sentences of page 6:

"The output power profile for the plurality of transmitters 24 is established, on a per channel basis, using pre-emphasis circuits 28. Circuits 28 can be set at manufacture... In order to minimize gain variations, due to amplifier variations, as illustrated in Fig. 2, pre-emphasis circuits 28 set the output power profile of transmitters 24 in accordance with the inverse of the common, composite gain profile of the amplifiers associated with the spans 16-1, -2, -3 ... -S raised to a predetermined exponent.

For all of the above reasons, it is submitted that claim 30 does in fact enable a person of skill in the art to make and use the invention thereof.

In objecting to claim 31, the Examiner has asserted:

"the instant application does not define what is 'a range of wavelengths'  
(bottom of page 5, top of page 6 of Office Action).

It is submitted that an exemplary range of wavelengths is clearly disclosed in Fig. 2 of the present application. The Examiner also asserted that the instant application does not define:

"how the gain profile of 'a range of wavelengths' can be used for the pre-emphasis method." (top of page 6 of Office Action)

In making the above statement, the Examiner seems to be ignoring the description of the second full paragraph of page 5 of the present application as well as the description starting at the second full paragraph of page 6 of the application and extending through the bottom of page 9. It is submitted that there is extensive discussion directed to this point.

The Examiner further asserted that:

"The application does not teach how to raise "the inverse of the gain profile to an exponent" (page 6, Office Action)

The application clearly discusses, on at least page 7, third paragraph thereof that:

"Fig. 4 is an exemplary, composite plot of the inverse of the gain profile of a composite gain element which incorporates a power amplifier, such as 14a, and a pre-amplifier such as 14b (having gain profiles as in Fig. 2) raised to the power of two. Where the pre-emphasis circuits 28 are adjusted in accordance with the profile of Fig. 4, gain variations, which otherwise multiply as signals travel through the respective spans S1, S2 of the network 20 can be eliminated. Similarly, where the value of S equals four, pre-emphasis circuitry 28 can be set such that the power output profile

transmitters 24, on a per channel basis, corresponds to the inverse of the composite gain profile raised to the fourth power. Once again, gain variations due to amplifier gain profiles can be minimized or eliminated in up to four spans."

The application then goes on to discuss in detail additional aspects of the process and concludes on page 9, second last paragraph thereof:

"Setting the output power profile of module 30 in accordance with the inverse of the composite amplifier profile, based on Fig. 2, raised to the fourth power results in a module which can be used in conjunction with one, two, three or four spans without exceeding the receiver input ranges. Other exponents corresponding to larger numbers of spans can also be used." (page 9, present application)

It is submitted that it is unnecessary to describe the process of raising a given function to an exponent. This is a well known activity which could be carried out graphically or mathematically as would be understood by those of skill in the art. For at least the above reasons, the present application, figures and claim program comply with 35 U.S.C. §112 of the U.S. Patent Statute.

In responding to section 1 of the Office Action, replacement drawing sheets for Figs. 1, 2 are provided. Figs. 1, 2 have been labeled "Prior Art". Two additional element labels have been added to Fig. 1 as explained below, the vertical axis of Fig. 5 has been properly labeled.

Fig. 5 is:

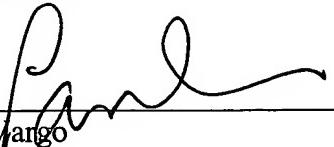
"a graph of expected received power variations, as a function of gain variation" (lines 4, 5, pg. 6 of present application)

Fig. 5 graphs received power variations from a predetermined target as a function of gain. The target is  $P_{tar}$ . The upper and lower bounds graphed on Fig. 5 literally illustrate (see explanation on page 8 of the application), "amount away from target" as a function of gain. Hence, it is submitted that Fig. 5 is properly labeled.

Allowance of the application is hereby requested.

Respectfully submitted,

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